

CLAIMS

WHAT IS CLAIMED IS:

1. (currently amended) A method for providing precise control of a magnetic coupling field in a NiMn top spin valve head, comprising:
forming at least one copper layer in a NiMn top spin valve;
oxidizing the at least one copper layer in the NiMn top spin valve; and
depositing remaining layers of the NiMn top spin valve head.
2. (original) The method of claim 1 wherein the at least one copper layer is naturally oxidized for 80 seconds under 8×10^{-5} Torr of oxygen pressure.
3. (original) The method of claim 1 wherein the at least one oxidized copper layer reduces the ferromagnetic coupling field without deteriorating GMR effect or resistance.
4. (original) The method of claim 1 wherein the at least one oxidized copper layer provides a negative coupling field without affecting GMR effect or resistance.
5. (original) The method of claim 1 wherein the at least one oxidized copper layer changes the crystalline texture growth of subsequent magnetic layers.
6. (original) The method of claim 1 wherein the at least one oxidized copper layer provides a negative coupling field that is achieved without affecting a GMR effect or resistance of the NiMn top spin valve head.
7. (original) The method of claim 6 wherein the at least one oxidized copper layer provides stronger growth of NiFe(111) and NiMn(111) with respect to NiFe(200) and NiMn(002) phases.
8. (original) The method of claim 1 wherein the at least one oxidized copper layer improves the interfacial roughness.
9. (original) The method of claim 1 wherein the at least one copper layer is oxidized prior to deposition of magnetic free layers.
10. (original) The method of claim 1 wherein the at least one oxidized copper layer comprises a copper seed layer.
11. (original) The method of claim 10 wherein the at least one oxidized copper layer further comprises a copper spacer layer.

12. (currently amended) The method of claim 1 wherein the oxidation of the at least one copper layer provides an approximately 15% increase in amplitude of the output of [[a]] the NiMn spin valve head at the same coupling field.

13. (currently amended) The method of claim 12 wherein the oxidation of the at least one copper layer does not affect asymmetry performance.

14. (original) The method of claim 1 wherein the at least one oxidized copper layer comprises a copper spacer layer.

39) 15. (new) A method for providing precise control of a magnetic coupling field in a NiMn top spin valve head, comprising:
forming at least one copper layer in a NiMn top spin valve;
oxidizing the at least one copper layer in the NiMn top spin valve to provide a negative coupling field without affecting GMR effect or resistance; and
depositing remaining layers of the NiMn top spin valve head.